Recovery Outline for the Pearl River Map Turtle (*Graptemys pearlensis*)

Species Common Name: Pearl River map turtle
Species Scientific Name: *Graptemys pearlensis*
ESA Listing Status: T; 12 July 2024; 89 FR 57206
Lead Region: Southeast Region; Atlanta, Georgia
Cooperating Region(s): N/A
Lead Office: Mississippi ES Field Office
Cooperating Office(s): Louisiana ES Field Office
Lead Contact: Luke Pearson
Species Range: Mississippi and Louisiana

PURPOSE AND DISCLAIMER

The recovery outline is a succinct document that presents a preliminary recovery strategy and actions to direct a newly listed species' recovery efforts until a recovery plan is completed. Recommendations in the recovery outline are non-binding and are intended to guide (not require) regulatory (e.g., section 7 consultations and section 10 permitting) and conservation actions to be implemented by the Service and our external partners.

This document lays out a preliminary course of action for the survival and recovery of the Pearl River map turtle. Formal public participation for recovery planning will be invited upon the release of the draft recovery plan. However, we will consider any new information or comments that members of the public offer in response to this outline during the recovery planning process. For more information on Federal recovery efforts for Pearl River map turtle, or to provide

additional comments, interested parties may contact the lead field office for this species at the above address and telephone number.

1. BACKGROUND

The purpose of this recovery outline is to provide an interim strategy to guide the conservation and recovery of the Pearl River map turtle until a final recovery plan is completed. Meeting the recovery needs of the subspecies will require cooperation among the U.S. Fish and Wildlife Service (Service), and other Federal and State agencies, Tribes, and the public. An outline of potential recovery actions for the Pearl River map turtle may help interested stakeholders understand how we envision its conservation proceeding until a recovery plan is finalized.

The final rule listing the Pearl River map turtle (*Graptemys pearlensis*) was published in the Federal Register on July 12, 2024 (89 FR 57206). The following sections include a summary of the biology, life history, and ecology of the species. A complete discussion of the species' morphology, taxonomy, distribution, phenology, reproduction, life span, demographic trends, and habitat needs can be found in the Species Status Assessment for the Pear River map turtle (Service 2023). An electronic copy of the assessment report is available on the ECOS species webpage for Pearl River map turtle (https://ecos.fws.gov/ecp/species/10895).

Important Information Gaps and Treatment of Uncertainties

We have identified several areas where little or no information on the Pearl River map turtle life history, demographics, threats, and distribution exists. Additional data in the following areas may provide knowledge to understand and improve species' recruitment and recovery efforts:

1. Population trends over time.
2. Lifespan, annual survivorship of each age class, growth rates, and age at sexual maturity.
3. Reproductive biology, including clutch size, clutch frequency, rates of nest predation and success, and microhabitat of nesting locations (i.e., canopy cover, soil qualities).
4. Factors that influence population density, including diet (e.g., prey preference, nutritional value of invasive Corbicula) and macro- (e.g., river depth, sandbar area/height, landscape use) and microhabitat conditions (emergent/submerged woody debris, substrate type, velocities).
5. Spatial ecology to determine occupancy in small tributaries, home ranges, dispersal rates around in-stream barriers (e.g., weirs), microhabitat use, nesting ecology, and connectivity of populations.
6. Distribution in small tributaries within the Pearl River drainage, and investigation into potential occurrence in the Pontchartrain Basin, and if the species is observed, identify if these populations are viable and self-sustaining.
7. How the species responds to in-stream barriers, disturbances (e.g., gravel mining), or non-point source pollutants (e.g., sewage overflows).

Although several uncertainties are expected to influence Pearl River map turtle recovery, the following issues strongly contribute to recovery uncertainty:

1. The biotic or abiotic processes influencing population viability (recruitment, survivorship, persistence) and how these processes differ across the range are unknown.
2. Lack of long-term management and survey efforts that are key to sustaining optimal habitat quality and population monitoring that informs recovery efforts.

Limiting Ecological Traits

The Pearl River map turtle has similar life-history characteristics to other freshwater turtles, with long generation times (up to 20 years), delayed sexual maturity (up to 10 years), and low reproductive output (two clutches of six eggs each) (Service 2023). These characteristics limit the ability of the species to respond and adapt to the increasing frequency of stochastic environmental events (e.g., out-of-season flooding, pollution, erosion). Because of the Pearl River map turtle's longevity and long generation times, populations may appear to persist in areas; however, these populations may be limited to older individuals with little to no recruitment occurring (i.e., perception of persistence; Lovich et al. 2018). Information does suggest that the species can adapt to changing biotic conditions, such as the dietary shift from native mollusks to the invasive Asian clam (*Corbicula*; Vučenović and Lindeman 2021). This adaptive capacity may have somewhat reduced the rate of population decline by allowing the species to shift to a supplemental food source.

Threats

Pearl River map turtle populations are affected by a variety of factors, including habitat alteration through the construction of impoundments, desnagging (removal of large woody debris) and channelization efforts, urban and agricultural development and subsequent pollution from this development, and long-term climate impacts such as prolonged, out-of-season flooding and sea level rise (Service 2023). Habitat alteration, especially in-stream, can substantially reduce optimal microhabitats within river reaches that the Pearl River map turtle relies on for food, sheltering, and basking opportunities. This species is a riverine obligate, and any conversion of riverine habitat to lake-like (lentic) habitat can cause local extirpations, as seen with the construction of the Ross Barnett Reservoir in 1961. Additionally, stochastic environmental events, such as prolonged out-of-season flooding or extreme drought conditions, can cause increased nest mortality, reductions in prey quality and availability, and potentially poorer body condition.

Current Biological Status

Overview

The Pearl River map turtle (*Graptemys pearlensis*) is a freshwater turtle that inhabits rivers and large creeks with sand and gravel bottoms in the Pearl River drainage in Mississippi and Louisiana. The species current range includes approximately 795 river miles (1,280 river kilometers), with approximately half the range occurring in tributaries and the other half in mainstem rivers. Population declines have occurred due to alterations of habitat, hydrology, and water quality that have impacted prey sources (e.g., mollusks). The species has been extirpated from the portion of the Pearl River channel inundated by the construction of the Ross Barnett Reservoir in 1961, although a small relict population has been identified in a creek near the

reservoir. Current range wide population estimates range from 21,841 to 29,000 individuals (Lindeman et al. 2020, Devros et al. 2023).

3 Rs: For the purposes of the SSA, we assessed the Pearl River map turtle condition in five analysis units across the range of the species (Service 2023).

Resiliency: In the SSA, we determined three units exhibit moderate resiliency (Upper Pearl, Middle Pearl-Strong, Bogue Chitto) and two units exhibit low resiliency (Middle Pearl-Silver, Lower Pearl). Moderate resiliency units generally have moderate population abundances and number of occupied tributaries, and moderate habitat scores (calculated using water quality, protected lands, forested riparian cover, and presence of channelization and/or reservoirs).

Redundancy: We determined species-level redundancy is moderate-high due to relatively widespread distribution across the range of the species (Service 2023). Species presence in several smaller tributaries within four analysis units, excluding Middle Pearl-Silver, also indicates some ability to withstand catastrophic events.

Representation: Strong genetic structure is lacking within this species; however, species presence in differing habitat types, such as shoals on the Strong River, suggest that these populations could have a differing diet or life history than other populations. Additionally, tributary populations generally persist in habitats that are substantially different than mainstem river populations, with higher canopy cover, more gravel and shoal substrates, and less human traffic, emphasizing the importance of tributary populations for this species. These differences indicate adaptive capacity in the species providing some ability to withstand stochastic change.

Conservation Actions to Date

Conservation actions have included surveys (Selman and Jones 2017; Devros et al. 2023) and conservation genetics analysis (Pearson et al. 2020) for the Pearl River map turtle. Most conservation actions for the species have occurred indirectly through Section 7 consultation and status surveys of the sympatric, federally threatened ringed map turtle (*Graptemys oculifera*), with sporadic monitoring data since 1988 (Selman and Jones 2017). Because this species was recently described in 2010, it had no protections under Mississippi or Louisiana law and was harvested recreationally prior to listing under the Endangered Species Act. Targeted survey efforts for the Pearl River map turtle are necessary to document basic life-history information to inform population viability analyses and estimate population trends over time.

2. PRELIMINARY RECOVERY PROGRAM

Recovery Priority Number

Number: 11

Rationale: The Pearl River map turtle is assigned a recovery priority number of 11, indicating that the species faces a moderate degree of threat and has a low recovery potential. The degree of threat is considered moderate because, despite low densities and a lack of strong genetic structure, the Pearl River map turtle's distribution is widespread throughout its historical range including tributaries of the Pearl River drainage. This provides some measure of redundancy in

the face of stochastic threats that may impact habitat quality or mollusk (prey) abundance. However, there is a low potential for recovery as the threats affecting the species occur at a severity and scale (landscape-level) that is difficult to reduce, remove, or mitigate to the level that will meaningfully contribute to species' recovery. Local habitat and conservation actions may benefit populations but would not necessarily mitigate range wide population declines. Captive breeding efforts to augment wild populations, or other intensive management actions, may be feasible if deemed necessary in the future.

Preliminary Recovery Strategy

The ultimate goal of the recovery efforts is to ensure the long-term viability of the Pearl River map turtle by implementing conservation actions that result in populations that are self-sustaining, with sufficiently large populations, and that occur within the species' current distribution, such that protections afforded by the Endangered Species Act are no longer required. The interim recovery actions include the development and implementation of a Pearl River map turtle monitoring plan. The species will be monitored at representative sites within the Pearl River drainage to quantify population demographics and provide insight into life-history characteristics (e.g., reproduction, survivorship) and habitat needs and conditions. New and continued partnerships with County, State (MS/LA), and Federal agencies and non-governmental organizations (NGOs) will be needed to protect habitat integrity and quality of rivers and streams throughout the drainage, as well as encourage and support community-based watershed stewardship planning and actions. Finally, we will develop Pearl River map turtle captive propagation and genetic plans for reintroductions into the Pearl River drainage, if necessary. Recovery actions (not in priority order) may include:

Preliminary Recovery Actions

1. Develop monitoring plan to evaluate Pearl River map turtle populations and habitat quality in conservation areas.
2. Partner with the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) and Louisiana Department of Wildlife and Fisheries (LDWF) to determine impacts of fishing equipment (e.g., catfish slat traps, hoop nets) on turtle populations.
3. Work toward the goal of no in-stream and floodplain gravel mining within the Bogue Chitto River and lower Pearl River in partnership with the Louisiana Department of Wildlife and Fisheries and Mississippi Department of Wildlife, Fisheries, and Parks.
4. Facilitate improved habitat quality and population connectivity.
    a) Use the best available genetic techniques to assess effective population sizes, inbreeding depression, and connectivity of populations upstream and downstream of in-stream barriers.
    b) Determine feasibility of artificial barrier removal on the Pearl River to convert altered habitats to free-flowing systems and increase population connectivity.
    c) Reduce in-stream snag removal to increase the abundance of heterogenous habitats and provide basking, feeding, and sheltering locations.
5. Determine the impact of reducing invasive vegetation encroachment on nesting success of the Pearl River map turtle.
    a) Monitor number of nests and pre- and post-vegetation treatment to determine efficacy of vegetation removal through the use of slash-and-spray or cut-stump

herbicide application, (e.g., Chinese Tallow trees), broadcast herbicide (e.g., cogon grass), mechanical removal, or other techniques.

6. Determine the rate of nest predation and implement predator control techniques as necessary.
    a) Monitor nest predation pre- and post-predator control implementation to determine technique effectiveness. Implement adaptive management in predator control techniques to reduce impacts of nest predation, as necessary.
    b) Monitor hatchling emergence to determine nest success.
7. Reduce off-road vehicle use on gravel and sand bars during the nesting and hatching season (early May to October) through educational outreach to the public and partnerships with LDWF and MDWFP law enforcement.
8. Implement Service-approved captive propagation and reintroduction plans, if necessary, to supplement current populations or establish populations in areas of extirpation within the historical range of the species.
    a) Monitor supplemented and reintroduced individuals to determine efficacy of augmentation and reintroduction efforts.
9. Formulate actions to protect additional lands adjacent to the Bogue Chitto River, Strong River, Yockanookany River, and Pearl River.
    a) Evaluate the distribution of key Pearl River map turtle populations within the range, identify important areas for habitat conservation and land acquisition, and prioritize these areas.
    b) Pursue cooperative agreements with landowners, Habitat Conservation Plans, conservation easements/servitudes, and work with public land managers to improving existing best management practice implementation and increase riparian buffer quality.
    c) Evaluate potential for land acquisition of riparian areas along the Pearl River or its major tributaries for protection and management by NGOs, State (e.g., WMA, State Park), or Federal partners (e.g., National Park, National Forest, NWR).
10. Develop educational materials about the Pearl River map turtle and post signage at public river access to inform the public and generate public support for recovery actions.

3. RECOVERY PRE-PLANNING CONSIDERATIONS

We will prepare a Recovery Plan for the Pearl River map turtle informed by the Species Status Assessment report (Service 2023) and the best scientific data available. The Recovery Plan will include objective and measurable criteria that, when met, will ensure the conservation of the species. Recovery criteria will address all meaningful threats to the species and estimate the time and cost to achieve recovery. The Mississippi Ecological Services Field Office will lead the recovery planning effort.

Service policy states that a draft recovery plan will be completed within 18 months with a final plan available within two and half years of listing. A completed draft Recovery Plan is expected to be available by December 2025, and the final Recovery Plan is expected to be available by December 2026.

During the recovery planning process, we will seek input, comments, and review from multiple stakeholders in Mississippi and Louisiana, including State conservation agencies, species

experts, research universities, and conservation organizations. Species experts are currently cooperating in ongoing conservation actions including the planning and development of the species monitoring plan and the draft Recovery Plan.

Signed: AARON VALENTA Digitally signed by AARON VALENTA Date: 2024.09.09 08:55:34 -04'00' Date: _____

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